Assignment 02

PUBH 8878

1. Laird, Section 4.5, Exercise 2
2. Laird, Section 4.5, Exercise 7
3. Laird, Section 4.5, Exercise 11
4. Laird, Section 4.5, Exercise 14
5. Laird, Section 2.4, Exercise 4
6. Laird, Section 2.4, Exercise 7
7. Consider a sample size of n of unrelated haploid individuals is obtained from some population with the objective of estimating allele frequency at a biallelic locus. The sample contains x copies of A, and $n - x$ copies of a.

    a. Plot the probability distribution of X given $n = 30$, and $\theta = .1$. Plot the probability distribution of X given $n = 1000$, and $\theta = .1$.
    b. Lets say we observed 30 samples, with 10 copies of allele A. Plot the likelihood function for θ
    c. What is the MLE of θ?
    d. Let's say $n = 1000$, and $x = 100$. What is the sampling variance of $\widehat{\theta}$?
    e. Let's say $n = 100$, and $x = 10$. What is the sampling variance of $\widehat{\theta}$? Why is this different than the result above?